

CLAIMS

What is claimed is:

1. A packaging material for assembling a semiconductor die, the packaging material comprising a negative-CTE material, wherein the packaging material is a material selected from a group consisting of mold compound, glob-top material, die attach material, and lid attach material.
2. The packaging material of claim 1, wherein the negative-CTE material comprises a tungstate material.
3. The packaging material of claim 2, wherein the tungstate material comprises a material selected from a group consisting of zirconium tungstate, halfnium tungstate, and a solution of zirconium and halfnium tungstate.
4. A method comprising:
 - dispensing a die attach material onto a chip carrier, wherein the die attach material comprises a negative-CTE material; and
 - attaching a semiconductor die to the die attach material.
5. The method of claim 4, wherein dispensing the die attach material onto the chip carrier further comprises dispensing the die attach material onto a structure selected from a group consisting of a package substrate and a leadframe.

6. The method of claim 4, wherein dispensing a die attach material comprising a negative-CTE material further comprises dispensing a die attach material comprising a tungstate material.
7. The method of claim 6, wherein dispensing a die attach material comprising a negative-CTE material further comprises dispensing a die attach material comprising a material selected from a group consisting of zirconium tungstate, halfnium tungstate and a solution of zirconium and halfnium tungstate.
8. A method comprising:
 - attaching a semiconductor die to a chip carrier; and
 - encapsulating the semiconductor die with an encapsulant comprising a negative-CTE material.
9. The method of claim 8, wherein attaching the semiconductor die to a chip carrier further comprises attaching the semiconductor die to a structure selected from a group consisting of a package substrate and a leadframe.
10. The method of claim 8, wherein encapsulating the semiconductor die with an encapsulant comprising a negative-CTE material further comprises encapsulating the semiconductor die with an encapsulant comprising a tungstate material.

11. The method of claim 10, wherein encapsulating the semiconductor die with an encapsulant comprising a tungstate material further comprises encapsulating the semiconductor die with a material selected from a group consisting of zirconium tungstate, hafnium tungstate and a solution of zirconium and hafnium tungstate.
12. The method of claim 11, wherein encapsulating the semiconductor die with an encapsulant comprising a negative-CTE material further comprises encapsulating the semiconductor die with a material selected from a group consisting of a mold compound and a glob-top material.
13. A method comprising:
 - dispensing a lid attach material onto a package substrate and an inactive surface of a semiconductor die, wherein the lid attach material comprises a negative-CTE material; and
 - adhering a package lid to the lid attach material.
14. The method of claim 13, wherein dispensing the lid attach material comprising a negative-CTE material further comprises dispensing a lid attach material comprising a tungstate material.
15. The method of claim 14, wherein dispensing the lid attach material comprising a tungstate material further comprises dispensing a lid attach material comprising a material

selected from a group consisting of zirconium tungstate, halfnium tungstate, and a solution of zirconium and halfnium tungstate.

16. A semiconductor die assembled into a packaged semiconductor device by a method comprising:

dispensing a die attach material onto a chip carrier, wherein the die attach material comprises a negative-CTE material; and
attaching a semiconductor die to the die attach material.

17. The semiconductor die of claim 16, wherein dispensing the die attach material onto the chip carrier further comprises dispensing the die attach material onto a structure selected from a group consisting of a package substrate and a leadframe.

18. The semiconductor die of claim 17, wherein dispensing a die attach material comprising a negative-CTE material further comprises dispensing a die attach material comprising a tungstate material.

19. The semiconductor die of claim 16, wherein the method further comprises encapsulating the semiconductor die with an encapsulant comprising a negative-CTE material.

20. The semiconductor die of claim 19, wherein encapsulating the semiconductor die with an encapsulant comprising a negative-CTE material further comprises

encapsulating the semiconductor die with an encapsulant comprising a tungstate material.

21. The semiconductor die of claim 19, wherein encapsulating the semiconductor die with an encapsulant further comprises encapsulating the semiconductor die with a material selected from a group consisting of a mold compound and a glob-top material.

22. A semiconductor die assembled into a packaged semiconductor device by a method comprising:

dispensing a lid attach material comprising a negative-CTE material over the inactive surface of a semiconductor die and around at least a portion of a perimeter of the upper surface of a package substrate; and
adhering a package lid to the lid attach material.

23. The method of claim 22, wherein dispensing the lid attach material comprising a negative-CTE material further comprises dispensing a lid attach material comprising a tungstate material.

24. The method of claim 23, wherein dispensing the lid attach material comprising a tungstate material further comprises dispensing a lid attach material comprising a material selected from a group consisting of zirconium tungstate, halfnium tungstate, and a solution of zirconium and halfnium tungstate.